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### (54) PROCESS AND DEVICE FOR DOSING DETERGENT COMPOSITIONS

VERFAHREN UND VORRICHTUNG ZUM DOSIEREN VON WASCHMITTELN

PROCEDE ET DISPOSITIF DE DOSAGE DE COMPOSITIONS DETERGENTES

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**US-A- 4 503 575**

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## Description

### Field of the invention

[0001] The present invention relates to a process and a device for dosing detergent compositions. More in particular, it relates to a process and a device for accurately dosing one or more liquid detergent compositions which may be aggressive and give rise to corrosion.

### Background of the invention

[0002] Caustic and viscous chemicals are often not metered but rather pumped during a specified amount of time, because flow meters are expensive and such chemicals may corrode and destroy the flow meters.

[0003] Another problem associated with liquid detergent delivery systems of the prior art is concerned with the corrosion of the pumps and tubes applied in such systems to transport the detergent material.

[0004] The European patent application 403,296 addresses these problems related to the delivery of viscous and caustic chemical materials. This document discloses a liquid chemical delivery system, comprising a liquid distribution line having a plurality of output ports; a manifold coupled to said liquid distribution line; a plurality of pump means coupled to said manifold, each pump means including means for pumping a corresponding chemical into said manifold; transport pump means, coupling said manifold to said distribution line; and water supply means coupled to said manifold.

[0005] However, this liquid delivery system is rather complex and expensive. Furthermore, this system was found to be less suitable for accurately dosing liquid detergent chemicals into a washing machine.

[0006] A further document US-A-4 503 575 discloses a method and device for dosing detergent in a washing machine, in which a tank is filled with water up to a sensor level, then drained of some of the water corresponding to the volume of detergent required. Detergent is then added to the tank up to the said sensor level.

[0007] It is, therefore, an object of the present invention to provide a process for accurately dosing liquid detergent materials, in particular viscous and caustic detergent materials. A further object is to provide a device suitable for carrying out said process. It was surprisingly found that these objects could be achieved with the process and the device of the present invention.

### Definition of the invention

[0008] According to a first aspect of the present invention, there is provided a method of delivering a liquid detergent product, comprising the steps of

- (i) allowing a predetermined volume of water to be dosed into a container (1), using a flow meter (3), a valve means (A) and, optionally, water supply pump

means;

- (ii) activating a pump means so as to deliver a liquid detergent product into said container until the container is completely filled, said filling operation being controlled by a level sensor (9) located on the container;

- (iii) delivering the content of the container.

[0009] According to a second aspect of the invention, there is provided a device for carrying out the method according to any of the preceding claims, comprising

- (a) a container (1) provided with a level sensor (9) and coupled with an output line (10) provided with an output valve (B);

- (b) one or more pump means (4-7) coupled to said container, each pump means having means for pumping a corresponding detergent product into said container;

- (c) an input valve means (A) and a flow meter (3) located on a water input line (2) connected to said container and allowing a predetermined amount of water to be accurately dosed;

- (d) control means connected to said one or more pump means (4-7), said level sensor (9), said input and output valve means (A,B), said flow meter (3) and optionally said water supply pump means, for activating or deactivating specific pump means or the valve means A or B.

### Detailed description of the invention

[0010] Accurate dosing is possible with the device of the present invention, for the following reasons. The volume of detergent material to be dosed is determined by the volume of the container controlled with the level sensor and the volume of the water supplied therein and is governed by the equation

$$V_d = V_c - V_w,$$

wherein

- $V_d$  is the volume of the detergent material
- $V_c$  is the volume of the container
- $V_w$  is the water volume in said container.

[0011] The volume of the container is constant and the volume of the water which is fed into the container before the detergent material is dosed, is programmable and controlled by a flowmeter and valve means located in the water input line. It follows that the detergent material can be accurately dosed by controlling the volume of water fed into the container.

Said volume of water is also suitable for adequately diluting viscous detergent material to be dosed. Furthermore, it is an important characteristic of the de-

vice of the invention that no flow meter is needed for controlling the volume of detergent material to be dosed; this is done by the flow meter in the water input line. As a consequence, the flow meter applied cannot be corroded or even destroyed if caustic detergent materials are applied. Furthermore, the flow meter cannot be blocked by undissolved material if suspended liquids are used.

**[0012]** An additional advantage of the process and device according to the present invention is that a predetermined and accurate amount of detergent product can be filled into the container some time before it is needed for use and that, as a consequence, said product can be delivered quickly when it is needed.

**[0013]** The device of the invention is particularly suitable for delivering liquid detergent product into a washing machine. The device of the invention can be used for dosing various amounts of the same liquid detergent product. However, said device is preferably used for dosing various products into a washing machine. In that case, a plurality of pump means is used for pumping corresponding detergent products into the container. Furthermore, control means are present for timely activating specific pump means and dosing accurate amounts of predetermined detergent products into the container. The device of the invention is particularly suitable for dosing various detergent products into an industrial washing machine.

**[0014]** The control means applied in the device of the invention for (de-)activating specific pump means and the valve means A and B, are preferably such that automatic operation of the device of the invention will be possible.

**[0015]** The maximum volume which can be dosed is restricted by the total volume of the container and two or more dosing procedures are required if more than said volume needs to be dosed.

**[0016]** For cleaning purposes, it is preferred to flush the container by pumping water through it after each time that a liquid product has been pumped into the container and supplied to a washing machine. Furthermore, blockages are prevented from occurring by carrying out this flushing procedure. After the flush with water, a flush with air may be applied.

**[0017]** Examples of detergent compositions which can be dosed by means of the process of the invention are the non-aqueous liquids disclosed in the European patent application 266,199 (Unilever). When this type of liquids is dosed, it is desirable that these liquids are introduced into the container from the upper side (i.e. on top of the water volume already present therein). Other types of liquid detergent products are, however, usually fed into the container at the bottom side, as further described below.

**[0018]** The invention will now be further explained by means of the accompanying drawing, in which Figures 1-4 are schematic views of the device according to the invention.

**[0019]** Figure 1 shows a container 1 into which water has been fed via conduit 2. The amount of water fed or pumped into the container is controlled with flow meter 3 and solenoid valve A. This valve has been closed immediately after the programmed volume of water has been supplied.

Subsequently, one of the detergent pumps 4 - 7 is activated to dose the corresponding detergent product via conduit 8 into the container 1 in which the predetermined volume of water is already present. The supply pump is switched off when container 1 is completely filled. This is detected by a level sensor 9. A float switch is preferably used as level sensor.

For smooth operation of the device of the invention, an air vent 12 is provided on the container 1.

**[0020]** Figure 2 shows the container 1 into which both water and detergent material have been fed.

**[0021]** After the detergent supply pump has been switched off, solenoid valve B is opened to supply the content of the container via conduit 10 into a washing machine 11. As final step of this preferred embodiment of the invention, container 1 and lines 8 and 10 are flushed with water and subsequently with air.

**[0022]** The flush with water is carried out by opening both valve A and B and, optionally, by activating a water supply pump means (not shown).

To further clean container 1 and transport lines 8 and 10, a "flush" with air is applied after the water flush. This air flush is carried out in two steps, as depicted in figures 3 and 4.

First, line 10 is emptied and cleaned by closing valve B and opening air valve C, as shown in Figure 3.

Subsequently, the rest of the system is cleaned by closing air valve C, opening again valve B, closing air vent 12, and opening air valve D (see Figure 4).

## Claims

1. Method of delivering a liquid detergent product, comprising the steps of

(i) allowing a predetermined volume of water to be dosed into a container (1), using a flow meter (3), a valve means (A) and optionally a water supply pump means;

(ii) activating a pump means so as to deliver a liquid detergent product into said container until the container is completely filled, said filling operation being controlled by a level sensor (9) located on the container;

(iii) delivering the content of the container.

2. Method according to claim 1, wherein the pump means is one of a plurality of pump means (4-7) for pumping corresponding detergent products into the container.

3. Method according to claim 1 or 2, further including the step of opening valve means A and, optionally, activating the water supply pump means, so as to have water flowing through said container after each time that a liquid product has been pumped into the container and the contents of the container delivered, thereby flushing the container with water. 5
4. Method according to claim 3, further including the step of applying air to flush and empty the container. 10
5. Method according to any of claims 1-3, wherein high viscosity liquid detergent is applied, which is diluted with water in the container before being supplied into the washing machine. 15
6. Method according to any of claims 1-5, wherein the liquid detergent product is delivered into a washing machine. 20
7. A device for carrying out the method according to any of the preceding claims, comprising
- (a) a container (1) provided with a level sensor (9) and coupled with an output line (10) provided with an output valve (B); 25
  - (b) one or more pump means (4-7) coupled to said container, each pump means having means for pumping a corresponding detergent product into said container; 30
  - (c) an input valve means (A) and a flow meter (3) located on a water input line (2) connected to said container and allowing a predetermined amount of water to be accurately dosed; 35
  - (d) control means connected to said one or more pump means (4-7), said level sensor (9), said input and output valve means (A,B) and flow meter (3), for activating or deactivating specific pump means or the valve means A or B. 40
- Patentansprüche** 45
1. Verfahren zum Abgeben eines flüssigen Detergensprodukts bereitgestellt, umfassend die Schritte:
- (i) Zulassen eines Dosierens eines vorbestimmten Wasservolumens in einen Behälter (1) unter Verwendung eines Durchflussmengenmessgeräts (3), einer Ventileinrichtung (A) und wahlweise einer Wasserzufuhrpumpeneinrichtung; 50
  - (ii) Aktivieren einer Pumpeneinrichtung, so dass ein flüssiges Detergensprodukt in den besagten Behälter abgegeben wird, bis der Behälter ganz gefüllt ist, wobei der besagte Füllvorgang von einem auf dem Behälter angeordneten Pegelsensor (9) gesteuert wird; 55
  - (iii) Abgeben des Inhalts des Behälters.
2. Verfahren nach Anspruch 1, bei dem die Pumpeneinrichtung eine von einer Mehrzahl von Pumpeneinrichtungen (4-7) zum Pumpen von entsprechenden Detergensprodukten in den Behälter ist.
3. Verfahren nach Anspruch 1 oder 2, weiter einschließlich den Schritt eines Öffnens der Ventileinrichtung A und, wahlweise, Aktivieren der Wasserzufuhrpumpeneinrichtung, so dass man jedes Mal, wenn ein flüssiges Produkt in den Behälter gepumpt und der Inhalt des Behälters abgegeben worden ist, Wasser durch den besagten Behälter fließen lässt, wodurch der Behälter mit Wasser gespült wird.
4. Verfahren nach Anspruch 3, weiter einschließlich den Schritt einer Verwendung von Luft zum Spülen und Entleeren des Behälters.
5. Verfahren nach einem der Ansprüche 1-3, bei dem ein flüssiges Detergens mit hoher Viskosität verwendet wird, das im Behälter mit Wasser verdünnt wird, bevor es in die Waschmaschine zugeführt wird.
6. Verfahren nach einem der Ansprüche 1-5, bei dem das flüssige Detergensprodukt in eine Waschmaschine abgegeben wird.
7. Vorrichtung zum Durchführen des Verfahrens nach einem der vorangehenden Ansprüche, umfassend:
- (a) einen Behälter (1), der mit einem Pegelsensor (9) versehen und mit einer Auslassleitung (10) verbunden ist, die mit einem Auslassventil (B) versehen ist;
  - (b) eine oder mehrere Pumpeneinrichtungen (4-7), die mit dem besagten Behälter verbunden sind, wobei jede Pumpeneinrichtung eine Einrichtung zum Pumpen eines entsprechenden Detergensprodukts in den besagten Behälter aufweist;
  - (c) eine Einlassventileinrichtung (A) und ein Durchflussmengenmessgerät (3), die auf einer mit dem besagten Behälter verbundenen Wassereinlassleitung (2) angeordnet sind und es gestatten, eine vorbestimmte Wassermenge genau zu dosieren;
  - (d) Steuereinrichtungen, die mit der besagten einen oder den besagten mehreren Pumpeneinrichtungen (4-7), dem besagten Pegelsensor (9), den besagten Einlass- und Auslassventileinrichtungen (A,B) und dem Durchflussmen-

genmessgerät (3) verbunden sind, um spezielle Pumpeneinrichtungen oder die Ventileinrichtungen A oder B zu aktivieren oder zu deaktivieren.

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## Revendications

1. Procédé de distribution d'un produit détergent liquide, comprenant les stades de :

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- i) permettre de doser un volume prédéterminé d'eau dans un récipient (1) en utilisant un doseur d'écoulement (3), un moyen de soupape (A) et, facultativement, un moyen de pompe d'alimentation en eau ; 15
- ii) activer un moyen de pompe de façon à distribuer un produit détergent liquide dans ledit récipient jusqu'à remplissage complet du récipient, ladite opération de remplissage étant réglée par un capteur de niveau (9) situé sur le récipient ; 20
- iii) distribuer le contenu du récipient.

2. Procédé selon la revendication 1, dans lequel le moyen de pompe est l'un parmi une pluralité de moyens de pompes (4-7) pour pomper les produits détergents correspondants dans le récipient. 25

3. Procédé selon la revendication 1 ou 2, comportant de plus le stade d'ouvrir le moyen de soupape A et, facultativement, d'activer le moyen de pompe d'alimentation en eau de façon à faire écouler l'eau à travers ledit récipient après chaque pompage d'un produit liquide dans le récipient et après distribution du contenu du récipient de façon à rincer le récipient à l'eau. 30 35

4. Procédé selon la revendication 3, comportant de plus le stade d'appliquer de l'air pour rincer et vider le récipient. 40

5. Procédé selon l'une quelconque des revendications 1 à 3, dans lequel on utilise un détergent liquide à viscosité élevée qui est dilué avec l'eau dans le récipient avant d'être introduit dans la machine à laver. 45

6. Procédé selon l'une quelconque des revendications 1 à 5, dans lequel le produit détergent liquide est distribué dans une machine à laver. 50

7. Dispositif pour mettre en oeuvre le procédé selon l'une quelconque des revendications précédentes, comprenant : 55

- a) un récipient (1) muni d'un capteur de niveau (9) et couplé à une conduite de sortie (10) mu-

nie d'une soupape de sortie (B) ;

b) un ou plusieurs moyens de pompes (4-7) couplés audit récipient, chaque moyen de pompe ayant un moyen pour pomper un produit détergent correspondant dans ledit récipient ;

c) un moyen de soupape d'entrée (A) et un doseur d'écoulement (3) situés sur une conduite d'entrée d'eau (2) reliée audit récipient et permettant de doser précisément une quantité prédéterminée d'eau ;

d) un moyen de réglage relié au(x) moyen(s) de pompe(s) (4-7), au capteur de niveau (9), aux moyens de soupapes d'entrée et de sortie (A,B) et au doseur d'écoulement (3) pour activer ou désactiver les moyens de pompes spécifiques ou le moyen de soupape A ou B.

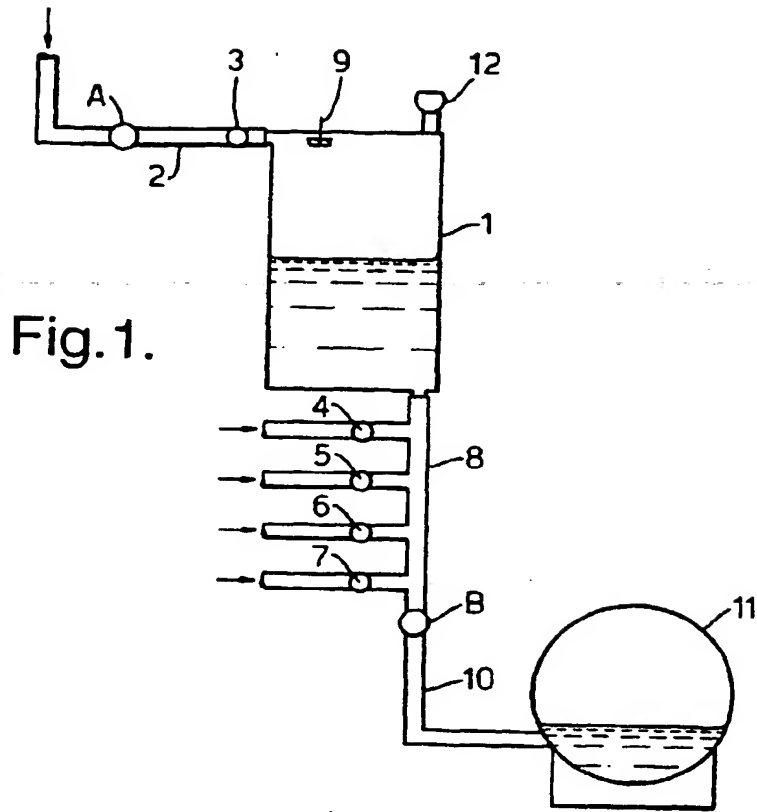


Fig. 2.

